

## ABSTRACTS OF CARDIOLOGY

**The Construction of the Cardiac Vector.** R. F. HILL.  
*Amer. Heart J.*, 32, 72-81, July, 1946.

This article should be helpful to workers new to the field of cardiac vector study. The frontal plane cardiac vector may be constructed by measurements of potential differences in leads I, II, and III, or by obtaining the potential values at the right arm, left arm, and left leg by means of Wilson's unipolar lead. In the first method, directions are obtained from the sides of Einthoven's triangle or from their representation in Bayley's triaxial system; in the second method they are derived from axes joining the centre of Einthoven's triangle to its apices. If the scalar measurements in method I are called  $e_1$ ,  $e_2$ , and  $e_3$  respectively, and those in method II are called  $V_R$ ,  $V_L$ , and  $V_F$ , then we have the equations  $e_2 = e_1 + e_3$ , and  $e_2 = V_F - V_R$ ; but the author points out that this last relationship is invalid when the measurements are turned into vectors, and shows that under these circumstances  $V_L - V_R = e_1\sqrt{3}$ ,  $V_F - V_R = e_2\sqrt{3}$ , and  $V_F - V_L = e_2\sqrt{3}$ . Incidentally it is emphasized that the equation  $e_2 = e_1 + e_3$  has nothing whatever to do with Einthoven's triangle, but holds good for the relationship between any three points in an electrical field when considered as a closed loop, and when the galvanometric connections are arranged as they are in electrocardiography.

Paul Wood

**The Effect of Theophylline Aminoisobutanol on the Circulation in Congestive Heart Failure.** F. U. STEINBERG and J. JENSEN. *J. Lab. clin. Med.*, 31, 857-865, Aug., 1946.

The effect on the circulation of theophylline aminoisobutanol (0.24-0.48 g. intravenously) and (in a smaller number of cases) of aminophylline and sublingual glyceryl trinitrate was studied. The venous pressure was followed for 1 or 2 hours and the circulation time measured frequently, generally with "decholin." In nearly all of 14 cases tested there were falls in venous pressure and reductions in the circulation time. Considerable variations in the venous pressure were noted. There was generally an immediate rise after venepuncture and after coughing, vomiting, or straining. Relaxation or sleep caused a fall. The injection of theophylline usually caused an abrupt fall; sometimes this reached its lowest almost at once; always within half an hour. In the cases where the dose was 0.48 g. the fall varied between 8 and 77 with an average of 37 mm. of water. Aminophylline (0.48 g. intravenously) and nitroglycerin (0.6 mg. sublingually) were equally effective, but the fall seemed to be a little more lasting with

aminophylline. In a few patients there was no fall with any of these drugs and the results were rather inconstant from day to day. The fall was not accompanied by any change of plasma volume. The average circulation time was shortened by 10 seconds: the duration of the effect was not measured carefully but it seemed to be about an hour.

The authors conclude that theophylline has a useful place in the treatment of congestive failure, but mainly in emergencies because the effect begins to wear off quickly.

Maurice Campbell

**Observations on the Effect of Theophylline Aminoisobutanol in Experimental Heart Failure.** J. R. SMITH and J. JENSEN. *J. Lab. clin. Med.*, 31, 850-856, Aug., 1946.

Following the demonstration of Steinberg and Jensen that in patients with congestive heart failure theophylline aminoisobutanol lowered the venous pressure and shortened the circulation time, the authors have used the heart-lung preparation of the dog to investigate this action further. Heart failure was produced by adding 0.20 per cent chloral hydrate to the perfusing fluid (generally 0.8 g. in all). The subsequent addition of theophylline aminoisobutanol (0.06 g.) to the perfusing blood generally stimulated the myocardial contractions with restoration of function, so that pulmonary oedema and congestion were removed promptly (usually within 1 minute). Dilatation of the heart was overcome and the cardiac output increased. The strength of the cardiac beats was increased, and this did not seem to depend on any increased coronary arterial flow. It is concluded that the clinical benefit previously observed was due to improved myocardial function and pulmonary flow and that peripheral vasodilatation might also help in producing the improvement.

Maurice Campbell

**Fluids in Congestive Heart Failure.** C. M. LEEVY, J. A. STRAZZA, and A. E. JAFFIN. *J. Amer. med. Ass.*, 131, 1120-1125, Aug., 1946.

Some clinicians are now departing from the practice of restricting fluid intake in congestive heart failure; this communication advocates giving the patient as much fluid as he desires, or even forcing fluids. It is believed that restriction of intake to 2 pints (1.1 litre) daily or less may lead to dehydration of the tissues and toxic effects such as pyrexia and mental changes. A high fluid intake is held to facilitate the excretion of waste products by the congested kidney.

The authors report the results of an investigation of 122 patients with congestive failure to determine

the relative advantages of restricted fluids, fluids *ad libitum*, and forced fluids. All received a special diet containing little salt, while other routine methods of treatment for congestive failure were the same in the 3 groups. Mercurial diuretics were used "only when the degree of oedema was a major source of discomfort." Of those on restricted fluid (not more than 1200 ml. daily) and those on forced fluids (up to 7600 ml. daily) about equal proportions (one-sixth of the total) were unable to adhere to the regime because of the ensuing discomfort. Failure symptoms disappeared in the same time, after about 10 days, in each of the 3 groups. Of 36 patients in the restricted fluid group 1 developed symptoms attributed to dehydration. When fluids were forced no adverse effects were noted on dyspnoea, heart rate, circulation time, venous pressure, or cerebral function. The regime of fluids *ad libitum* was best tolerated. [These results suggest that fluid limitation in congestive failure is less necessary than has been assumed, and that it may on occasion be harmful; but they do not show dehydration toxæmia to be other than an exceptional result. The special diet used would be difficult to arrange in home treatment.]

Harold Cookson

**Circulatory Failure.** [In English.] J. McMICAL. *Schweiz. med. Wschr.*, 76, 851-857, Sept., 1946.

The "back-pressure" theory of cardiac failure, based on the idea that the veins are passive tubes, becomes obsolete with the knowledge that alterations in venous tone and calibre affect cardiac output. Starling showed from heart-lung preparations that the venous inflow directly governed the output of the heart; as the filling pressure rose the output increased, but when a certain point of distension was reached further stretching of the heart lowered its output. In early failure the heart's output is not significantly reduced, though its capacity for improvement is diminished. Output drops later in failure. Accurate estimations of output and filling pressure by Courmand's method of right auricular catheterization, performed without mishap in over 500 cases since 1941, have shown that in valvular and hypertensive heart disease with failure the rise in venous pressure is not the back-pressure effect of a falling output but a compensatory mechanism to maintain an optimal output. The first rise in venous pressure occurs when the output is only slightly below normal. As failure advances the venous pressure rises and output falls to 3 litres per minute (normal 5.3).

Digitalis is found to reduce the venous pressure; this is followed in the normal heart by a fall in output and in the failing heart by a rise. Similar results are obtained by venesection, irrespective of the ventricular rate, which suggests that the value of digitalis lies primarily in its action on venous pressure rather than in its slowing effect on heart rate in auricular fibrillation. That digitalis takes a venous overload off the heart is supported radiologically by evidence of reduction in heart size, and clinically by the equally

good results of digitalization in failure with normal rhythm. Anæmia, emphysema, thyrotoxicosis, beriberi, traumatic arteriovenous aneurysm, and Paget's disease are characterized by high cardiac output. In severe anæmia blood volume is always reduced, indicating that the venous congestion is due to compensatory increase in venous tone and reduction of vascular bed. In anæmia with hæmoglobin below 30% the output is doubled, venous pressure high, and pulse fast. These patients are already in a critical condition with venous congestion and oedema, and transfusion may be dangerous by further increasing venous pressure, unless given slowly with digitalis. Digitalis alone, by reducing venous pressure, upsets this compensatory equilibrium and is, therefore, dangerous in heart failure from anæmia, emphysema, and acute or chronic cor pulmonale. For similar reasons it is useless in shock. In Paget's disease, where the effect of the increased skeletal circulation resembles arteriovenous aneurysm, failure occurs with high output and raised venous pressure. In pericardial tamponade the rise in venous pressure is again compensatory to maintain an effective cardiac filling pressure.

Peripheral circulatory failure (shock) is no longer believed to be due to pooling of blood in the veins or to hæmoconcentration. With hæmorrhage the effective volume of circulating blood is reduced and the heart's filling pressure and output cut down, but peripheral resistance is raised. The lowered blood pressure is due more to lack of vasoconstriction than to reduced cardiac output, which seldom falls below 3 litres per minute. Later vaso-vagal fainting may occur (with slow pulse and fall in blood pressure) from sudden vasodilatation of arterioles in skeletal muscles. Overwhelming bacterial toxæmia reduces both venous pressure and cardiac output, though suprarenal cortical damage may contribute. Further work on non-surgical shock suggests that peripheral vasodilatation and high cardiac output exist in early diabetic acidosis.

[The direct clinical application of some of the methods discussed in this paper have to be confirmed. In the failing heart the importance of the coronary circulation and of the balancing mechanism between right- and left-sided stress are additional factors of importance that call for consideration.]

J. L. Lovibond

**Experiences with Dicumarol in the Treatment of Coronary Thrombosis with Myocardial Infarction.**

I. S. WRIGHT. *Amer. Heart J.*, 32, 20-31, July, 1946.

Dicoumarol was used in cases of coronary thrombosis. The indications for its exhibition were: (1) repeated minor attacks of thrombosis; (2) embolic phenomena indicating intracardiac thrombosis. The procedure was as follows. The prothrombin time was estimated (13 to 14 seconds is normal). If normal or lower, 300 mg. of dicoumarol was given by mouth. Each morning the prothrombin time was

determined again, and afterwards a further dose of 300 mg. was given until the time was 30 seconds, or 100–200 mg. if between 30 and 35 seconds. When over 35 seconds the drug was discontinued until the time had fallen to 30 seconds. Smaller doses were then resumed (100 mg.). The course lasted 30 days. Haemorrhagic manifestations occurred with the prothrombin time at 60 seconds, and were relieved by 300–500 ml. of fresh blood, and by vitamin K (menadione bisulphite) 64 mg. in 1 to 4 doses.

The results seemed to show a diminished mortality in the 76 cases observed. There was no unfavourable effect on the heart.

*Terence East*

**Testosterone in Angina Pectoris.** E. B. LEVINE and A. L. SELLERS. *Amer. J. med. Sci.*, **212**, 7–11, July, 1946.

Twenty-four male patients, average age 56 years, were treated with androgens. The authors conclude from this series that androgens are ineffective in the treatment of angina, though they consider that their results show that testosterone, especially in the form of testosterone propionate by injection, is of definite value in relieving the chest discomfort of the climacteric or of cases of neuro-circulatory asthenia in men of the angina age group.

*P. M. F. Bishop*

**Congenital Aortic Atresia.** N. H. ISAACSON, S. D. SPATT, and D. M. GRAYZEL. *J. Pediat.*, **29**, 222–225, Aug., 1946.

**Pheochromocytoma and Chronic Hypertension.** D. M. GREEN. *J. Amer. med. Ass.*, **131**, 1260–1265, Aug., 1946.

A case of pheochromocytoma is reported and 50 additional records from the literature are discussed. In cases where the paroxysmal features are overshadowed there is a remarkable resemblance to idiopathic hypertension. After the removal of an encapsulated renal tumour all the symptoms improved. In an analysis of 50 cases from the literature it is found that the majority are chronically hypertensive, and only a minority manifested intermittent hypertension. Of this latter group surgical removal of the tumour interrupted the disease in 12 of 14 patients. It is suggested that all patients with functioning pheochromocytoma will progress to a stage of chronic hypertension if they live long enough, and evidence of cardiovascular and renal disease then becomes common. In the interval between paroxysms in the intermittent type, kidney dysfunction is recorded in only 4 of 14 cases. In 22 cases in which the symptoms had progressed to a state of chronic hypertension, and with a mean duration of 4 years, there was a uniform fall in blood pressure after operation, and a retrogression of cardiovascular-renal abnormality.

*G. Hesketh*

**Temporal Arteritis.** D. A. DANTES. *J. Amer. med. Ass.*, **131**, 1265–1269, Aug., 1946.

The author reports a case of temporal arteritis, and discusses 27 unquestionable cases recorded. The

youngest was 55 years of age, the average age being 65 years. Pain is prominent, commonly in the temporal region. A temperature persists for several months, and there may be malaise and sweats. Ocular disturbance is common, oedema, exudates, retinal haemorrhages, and thrombosis of the retinal artery all occurring. Symptoms suggesting cerebral involvement have been observed. Characteristically a segment of one or both temporal arteries is prominent, indurated, nodular, and tender, and pulsation may be lost. Adjacent arteries may be affected. Complete clinical recovery occurs in the majority of cases, but permanent visual impairment may result from the retinal lesions.

*G. Hesketh*

**Potential Variations of the Right Auricular and Ventricular Cavities in Man.** H. H. HECHT. *Amer. Heart J.*, **32**, 39–51, July, 1946.

Intracardiac catheterization has made it possible to record, by means of an electrode in the right side of the heart, the changes in electrical potential in the venae cavæ, right auricle, and right ventricle in the human subject. It has been supposed that the unipolar lead (VR) from the right arm recorded the potential variations within the cavities of the heart. In this investigation 5 cases were studied. Two had right bundle-branch block, 1 had left bundle-branch block, and 2 had left ventricular enlargement. The position of the electrode was located by fluoroscopy.

There were three interesting observations: (1) At high auricular levels there are large predominantly negative auricular deflections. Endocardial auricular deflections are always biphasic and show a QRS type of deflection and are often followed by a T wave. At the lower levels a positive wave, which is called PR (like R in QRS), appears. (2) Ventricular complexes from the junctional area show negative deflections in a normally activated heart, and in left bundle-branch block. The deflections are positive in right bundle-branch block. (3) Ventricular complexes recorded at the higher auricular levels are different from those recorded at the lower levels and from the cavity of the right ventricle. They resemble those of the unipolar lead on the right arm (VR). In the auricle there is an area of primary and persistent electro-negativity which presumably corresponded to the site of the pacemaker away from which impulses spread, hence the negative sign. Records from the right ventricular cavity in left bundle-branch block do not differ from those in normals, for the left-side lesion does not affect the polarization of the right side. When there is right bundle-branch block the right ventricular endocardial curve is positive. This is due to the fact that the septum and right ventricular cavity are activated from the left side and so a layer of positive charges faces the right ventricular cavity.

These observations are in accord with the new nomenclature of bundle-branch block, and agree with the assumption that the action currents in the heart muscle are to be regarded as an electrical "source" (positive) followed by an electrical "sink" (negative).

The ventricular deflections from the higher auricular level differ from those of the right ventricular cavity because they represent the combined changes in the two ventricles together. When activation is normal these are negative. Such are the deflections of the right arm unipolar lead. If there is left bundle-branch block the right ventricular negativity will predominate. In right bundle-branch block the initial negative deflection is derived from the left ventricle but the broad positive deflection from the right ventricular cavity. [It would have been interesting to have had some normals.] *Terence East*

**The Influence of Drugs on the T Wave of the Electrocardiogram after Exercise.** (Über den Einfluss vegetativer Pharmaka auf den Ablauf der T-Zacken-Veränderungen im Arbeits-Elektrokardiogramm.) A. WALSER. *Cardiologia*, 10, 231-250, 1946.

Slight exertion and severe exertion were found to influence the height of T in opposite senses. Severe exertion caused an initial increase of T followed by a prolonged decrease. Slight exertion caused an initial decrease of T followed by a prolonged increase. The previous injection of sympatol-atropine accentuated the initial and the late changes in the height of T after severe exertion. Previous injection of physostigmine-gynergen accentuated only the initial increase in T after severe exertion but caused a more rapid return to the previous level. Neither sympatol-atropine nor physostigmine-gynergen caused a decisive difference in T-wave behaviour after slight exertion. The author concludes that parasympathetic excitation leads to an increase in the height of the T wave.

*G. Schoenewald*

**Heart Disease in Pregnancy.** W. B. STROMME and K. KUDER. *Amer. J. Obstet. Gynec.*, 52, 264-272, Aug., 1946.

Stromme and Kuder review the previous publications on this subject from the department and then analyse a further 720 cases of heart disease in pregnancy. They show that maternal mortality from sepsis and hæmorrhage have so far decreased that in the series analysed heart disease was the leading cause of maternal mortality. Rheumatic disease was responsible for 91 per cent of the heart cases, congenital lesions accounted for 4 per cent and hypertensive disease for 2 per cent. The authors stress the importance of evidence of decompensation or fibrillation. This is claimed to be often a legitimate indication for termination of pregnancy and sterilization.

The importance is stressed of careful supervision of all cases and treatment of selected ones in hospital. Heart disease was detected in 3 per cent of all obstetric cases analysed. Therapeutic abortions were performed in 8 per cent, and for delivery forceps were used more and Caesarean sections less than in the previous series reported from the same department. The total mortality rate was 12 per 1000 cardiac cases and the mortality in the group admitted as

emergencies was 7 times that of the group which received antenatal care. *J. Stallworthy*

**The Clinical Use of Cytochrome C in Patients with Intermittent Claudication.** S. PROGER and D. J. DEKANEAS. *Bull. New Engl. med. Center*, 8, 145-147, Aug., 1946.

The improved utilization of oxygen in the tissues resulting from the use of cytochrome C, on which the authors had previously reported (*J. clin. Invest.*, 1945, 24, 864), led them to examine its effects in cases of intermittent claudication. Cytochrome C was given intravenously in doses of 50 mg. daily to 13 patients suffering from intermittent claudication due to thrombo-angiitis obliterans or arteriosclerosis. Of these, 3 showed no improvement, 3 definite but moderate improvement, and 7 striking improvement. This was assessed by means of exercise tolerance tests, involving stair climbing and level walking. Controls were made with the injection of an inert solution similar in colour to that of cytochrome. The characteristic response was increase of exercise tolerance, which reached a maximum after 10 injections and was maintained for a long time after the injections had been discontinued, in 1 case almost a year. *B. Samet*

**The Effect of Meals on the Electrocardiogram in Normal Subjects.** E. SIMONSON, H. ALEXANDER, A. HENSCHER, and A. KEYS. *Amer. Heart J.*, 32, 202-214, Aug., 1946.

The effect of meals on the electrocardiographic records in 12 normal adults was studied and the results were analysed statistically. An hour after moderate meals significant changes were observed—increased heart rate,  $K_{QT}$  and QRS amplitude, decrease of T wave, duration of mechanical systole and QT interval, and left axis shift of the T axis. These changes were independent of the proportion of fat in the meal. *W. J. H. Butterfield*

**Changes in the Cardiovascular System in Scrub Typhus in Early Convalescence.** W. LIKOFF. *Amer. J. med. Sci.*, 211, 694-700, June, 1946.

The authors have investigated 100 Service patients in the convalescent stage of scrub typhus. Symptoms relating to the cardiovascular system, including tachycardia at rest, dyspnoea, præcordial pain following exercise, and syncope, were present in 30 per cent of the cases, and in only 2 of these were average daily pulse rates of under 100 recorded.

In the asymptomatic group—70 cases—only 4 patients had daily pulse rates of over 100. No evidence of organic valvular disease or cardiac failure was noted in any of the cases. Ten patients—all in the symptomatic group—gave electrocardiographic abnormalities. Three showed persistent bundle-branch or intraventricular block. Transient changes recorded included delayed A-V conduction, negative T waves in two or more leads, and slurring of the QRS complex without prolonged duration.

*A. Henderson-Begg*

**The Incidence of Palpable Dorsalis Pedis and Posterior Tibial Pulsations in Soldiers.** J. J. SILVERMAN.  
*Amer. Heart J.*, 32, 82-87, July, 1946.

The average age of the 1014 soldiers studied by one observer was 20, and 90 per cent were under 22. Absence of pulsation in the dorsal artery of the foot and in the posterior tibial together on the same side occurred in 0.5 per cent; posterior tibial pulsation was absent on one side in 5.6 per cent, dorsalis pedis in 25 per cent. Both posterior tibials were impalpable in 1.7 per cent, and both dorsal arteries of the foot in 7.5 per cent. There was a significant difference between white and negro soldiers in these respects. Among the white men one or other posterior tibial artery could not be felt in 2 per cent, and one or other dorsal artery of the foot in 27.1 per cent; whereas among the negroes these figures were 8 per cent and 6.6 per cent respectively.

[No precautions against the effects of cold, emotion, or other factors are described.] *Paul Wood*

**Cor Pulmonale in Ankylostoma Infection.** E. GARCÍA CARRILLO. *Arch. Inst. Cardiol. Méx.*, 16, 154-158, May 31, 1946.

Five cases in which the patients died from anæmia, ankylostomiasis, and multiple pulmonary emboli are presented with brief clinical and pathological findings. Both peripheral phlebitis of infective origin and peripheral circulatory stasis give rise to repeated pulmonary emboli. These factors combined with the poor nutritional state and anæmia of the majority of these patients are held sufficient to account for the heart failure and subsequent fatal issue.

*W. T. Cooke*

**Acute Pericarditis in Young Adults.** R. M. NAY and N. H. BOYER. *Amer. Heart J.*, 32, 222-223, Aug., 1946.

Forty-six cases of pericarditis occurring in soldiers, aged 18 to 37, were investigated by the authors at one of the American army rheumatic fever centres. The diagnosis was based on clinical findings—præcordial or substernal pain, pain on breathing, swallowing, and twisting the trunk, pain worse when lying prone, the presence of friction rubs, radiological evidence of effusion, and electrocardiographic changes. The patients could be divided into 3 groups: (1) 25 patients in whom the pericarditis was associated with signs and symptoms of rheumatic fever; (2) 15 patients in whom the lesion was of undetermined aetiology; (3) 6 patients in whom it was associated with other diseases, such as aneurysm or pleural effusion.

The leads studied were the standard limb leads and the apical lead, IVF. Elevation of S-T segments, in most cases in more than 1 lead, occurred during the first 10 days after the onset of pericarditis in more than half of the patients seen early. There was no reciprocal depression of S-T segments in leads that did not show S-T elevation. In 41 cases there was striking inversion of T waves and in more

than half the cases the T waves were negative, diphasic, or iso-electric in all 4 of the leads. These inversions were usually noted 5 days to 3 weeks after the onset of the disease and might persist for a few days or many weeks. These changes are thought to be highly specific, but repeated electrocardiograms are necessary to detect them.

*E. B. G. Reeve*

**Foreign Bodies in and in Relation to the Thoracic Blood Vessels and Heart. III. Indications for the Removal of Intracardiac Foreign Bodies and the Behaviour of the Heart During Manipulation.** D. E. HARKEN and P. M. ZOLL. *Amer. Heart J.*, 32, 1-19, July, 1946.

This article describes the removal of 26 pericardial and 13 intracardiac missiles. The reasons for operation are held to be: (1) prevention of embolism of the foreign body or associated thrombus; (2) reduction of danger of bacterial endocarditis; (3) prevention of recurrent pericardial effusion; (4) diminution of the incidence of myocardial damage. It is most important to locate the foreign body accurately and plan the operation so that the maximum facility of exposure is obtained. The heart tolerates dislocation badly. The ventricles may dilate, and interference with the outflow of blood may lead to circulatory collapse. Various arrhythmias, especially showers of extrasystoles, were noted. Bundle-branch block may occur. The surface of the heart must be kept moist. Suturing and superficial manipulation were well tolerated. Intracardiac manipulations were less well borne. Location of fragments is difficult, and many thought to be in the heart were really outside it.

*Terence East*

**Ligation of the Ductus Arteriosus.** A. R. GILCHRIST. *Edinb. med. J.*, 53, 346-354, July, 1946.

The persistence of a patent ductus arteriosus in extra-uterine life is known to carry with it certain severe complications in a proportion of cases. Infection with *Streptococcus viridans* leading to infective endarteritis and septic emboli is a condition of the gravest severity, and a varying amount of disability may result from the interference with ordinary circulatory mechanics. Both these complications can be overcome by occlusion of the ductus surgically.

The mechanical effects of a patent ductus are due to the fact that the pulmonary artery has to receive blood from both the right ventricle and the higher-pressure aortic stream via the ductus. The output of the left ventricle is thus stressed unduly to the extent by which it loses blood through the ductus. This effect can be observed under the radiological screen, when the forcible contraction of the left ventricle and excessive pulsation of the pulmonary artery may be obvious. The pulmonary artery may also be prominent and the vascular fields of the lung increased. Clinically the characteristic murmur is usually present, but it may not attain its continuous quality for some years. Below the age of 5 the signs are more equivocal and other signs, as mentioned

above, should be sought for. There is, in addition, the increased pulse pressure, which may be very noticeable after exercise. The fall in diastolic pressure following exertion is quickly restored, but when it can be recognized is a valuable diagnostic sign. Infection in the pulmonary artery develops at an area opposite the ductus entrance. Vegetations form and as they fragment are carried into the lungs as emboli. Radiologically, patchy opacities appear in the lung fields, and a positive blood culture is often obtained. Prolonged sepsis leads to cardiac enlargement with congestive failure.

Three cases of well-established infective endarteritis were submitted to operation; there were 2 fatalities from massive pulmonary collapse and 1 dramatic recovery. The author insists that "surgical ligation in the infected case is the only treatment to consider," and early diagnosis is of the greatest importance. Every case of known patent ductus with an unexplained pyrexia should be suspect.

In non-infected cases the reasons for surgery should be considered under several headings: (1) restoration of normal circulation and improvement of development, (2) prevention of infection, (3) prevention of later circulatory incapacity and congestive failure. A series of 36 cases in this class was studied, and 16 were operated on. In the surgical ligation series there were 2 deaths, 1 following a repeat operation (the ductus having re-canalized after original occlusion with catgut ligatures). Of the remainder there was 1 instance of apparent re-canalization and 2 of partial, ductus closure; all other cases show very satisfactory results.

The choice of age for operation, in the absence of infection or cardiac symptoms, lies between 7 and 10 years. Over the age of 20, operation should be reserved for cases that show definite symptoms or signs of disability. The operation is one which requires the specialized team-work of thoracic surgery. Complications in the form of hæmorrhage, pulmonary collapse, pleural effusion or infection may occur, but in the hands of experienced surgeons are rare.

*T. Holmes Sellors*

**Acute Rheumatism.** J. A. Glover. *Ann. rheum. Dis.*, 5, 126-130, June, 1946.

The incidence of acute rheumatism among trained troops has always been below expectation, in spite of the rigours to which they have been exposed. But it does occur in the form of "barrack epidemics" among recruits crowded into training centres. The author tabulates the estimated incidence of rheumatic fever among troops engaged in the Crimean, American Civil, South African, and Great Wars, and shows that there has been a steady decline in incidence and severity of the disease. He writes: "This astounding fact—that in the wet, the mud, and the stench of the trenches in Flanders in 1915 acute rheumatism was much less prevalent than in the high and magnificent climate of South Africa—seem to show that the disease had already begun its long decline in incidence and severity" Such a decline has been found in

civilian as well as in military medicine. In 1937 the death rate from rheumatic fever was less than a quarter of that in the period 1891-1900. It is claimed that the period between the two world wars was noteworthy in the history of rheumatic fever, for the decline in incidence of the disease, for the inception of systematic effort to prevent its ravages, and for the support for the theory that it is due wholly or in part to infection by the *Streptococcus pyogenes*.

The theory of streptococcal responsibility for rheumatic fever has been strengthened by the "barrack epidemics"; these occur when adolescents are collected and crowded together, and present a regular cycle in which an epidemic of streptococcal tonsillitis is followed after a latent interval by an outbreak of rheumatic fever. Recruits are vulnerable when exposed to unaccustomed training and fresh strains of streptococci. In these epidemics there is a high carrier rate for the streptococcus. The author quotes a number of reports of barrack epidemics, and emphasizes the damage they do among recruits for the Services, so many of whom, once they have acquired the infection, have to be "invalided out".

The war of 1939-45 affected the civilian population to an unprecedented extent, but nevertheless the decline in incidence of rheumatic fever continued and reached a new low level in 1942, when the crude all-age death rate sank to 12.1 per million—scarcely one-half of what it was in 1934. Figures are given of the decline in incidence in Cardiff, Bristol, Leicester, and Glasgow. Military experience showed a similar decrease in the incidence and severity of cases of rheumatic fever. A comparison is made of the numbers of Service patients treated in military and E.M.S. hospitals, and the proportion of patients suffering from rheumatic fever among all those with "rheumatism" appeared to be approximately the same in both types of hospital. It seems that the number of men invalided from the Services for rheumatic fever has steadily declined through recent wars.

The author discusses chemoprophylaxis, but points out that good ventilation and the avoidance of overcrowding are still the most important methods of preventing outbreaks of streptococcal disease. He quotes Cruickshank (*Mon. Bull. Min. Hlth.*, 1946, 5, 144), who says that while sulphadiazine prophylaxis seemed to help to control streptococcal epidemics, it had an unhappy sequel in the appearance of sulphonamide resistance in certain strains of the organism, and that prophylactic use of sulphonamide drugs might be limited to children who have had 2 attacks of rheumatic fever or have had 1 attack accompanied by carditis.

*W. Tegner*

**Laboratory and Clinical Criteria of Rheumatic Carditis in Children.** L. M. TARAN. *J. Pediat.*, 29, 77-89, July, 1946.

The essence of this paper is an assessment of the value of the various diagnostic criteria as a measure of continued activity in rheumatic carditis.

A group of 200 boys and girls, ranging in age from 6 to 14 years, was studied. They were observed from the beginning of an attack of rheumatic carditis to the end of the active process and for at least 6 months after this. The only treatment was good nursing, balanced diet, and moderate amounts of synthetic vitamins. Occasionally the patient was given small doses of salicylates for arthralgia. In each case a complete clinical and laboratory examination was carried out as well as a cardiographic and immunologic investigation.

**Leucocytosis.**—One out of 10, no leucocytosis at all; 9 out of 10, continued leucocytosis for the first 2 weeks; 7 out of 10, continued leucocytosis at end of fourth week. At the end of 7 weeks there was no leucocytosis in any case. All cases with a leucocytosis showed clinical rheumatic activity, and 9 out of 10 continued to show clinical rheumatic activity when the leucocytosis had disappeared.

**Fever.**—Fever as a manifestation of cessation of rheumatic activity is not borne out in this series; the average febrile period was 6 weeks.

**A-V Conduction.**—In this series a prolonged P-R interval in a rheumatic child in the absence of other laboratory or clinical evidence was not found a safe index of continued rheumatic activity, and the return to a normal conduction time did not always mean cessation of activity.

**Pulse Rate.**—This was found to be an adequate index of cessation of activity. There was no correlation between pulse rate and temperature. The rate was highest during the first 3 weeks of the disease and was as high as 140, and no case showed a drop to below 100 before the end of the ninth week.

**Sedimentation Rate.**—This was found not to be as reliable a guide as is commonly believed. Many cases showed a still active rheumatic condition with a normal sedimentation rate. At the end of 16 weeks a number of cases with no clinical evidence of activity had a slightly elevated sedimentation rate.

**Weight Gain.**—This also was not found to be an index of quiescence. At the end of 7½ months all the children had reached a normal weight gain level, yet 40 per cent still showed mild rheumatic activity.

**Hæmoglobin.**—All cases showed a moderately severe anæmia to start with, the hæmoglobin ranging from 7 to 9 g.; in 2 children it was as low as 5 g. It was only after 32 weeks that all the cases returned to 12.5 g. or more. However, 40 per cent still showed clinical rheumatic activity after the hæmoglobin was normal.

**Vital Capacity.**—In this series vital capacity proved to be the most sensitive single index, all the children having a vital capacity of 40 per cent or less below normal for age and body surface. None reached the normal again until 16 weeks after the onset of the carditis. This index also failed as a specific diagnostic measurement because some children continued to have clinical evidence of disease although the vital capacity was normal.

The relation between clinical activity and various

tests is indicated in a table. The author points out that active rheumatic disease must be suspected when there is a tendency to fatigue without cardiac insufficiency, emotional instability, and marked pallor. Tachycardia with a tumultuous rhythm, and a gallop rhythm with rapid or slow cardiac rate are looked upon as evidence of rheumatic carditis, and their absence as auscultatory evidence that carditis is at an end. However, the author finds that these criteria are inadequate in diagnosing mild smouldering carditis.

Richard Sands

**Significance of Downward T Waves in Precordial Leads of Normal Children.** E. GOLDBERGER. *Amer. J. Dis. Child.*, 71, 618–621, June, 1946.

Goldberger took electrocardiographs in 50 children, aged 5 to 11 years, who were regarded as normal from the cardiac point of view. He used a unipolar præcordial electrode in 6 positions from the right of the sternum to the mid-axillary line, i.e. leads  $V_1$ – $V_6$ . In 9 children (18 per cent) T was inverted in lead  $V_4$ —i.e. with the electrode in the fifth left interspace in the mid-clavicular line. He found that when the QRS complex shows an RS pattern, which is usual when the electrode is placed to the right of the left mid-clavicular line, T may be inverted or upright. But when QRS shows a QR or a QRS pattern, as is usual in leads  $V_5$  and  $V_6$ , T is upright. An inverted T in association with a QR pattern is stated to be always abnormal. The RS pattern, with which the inverted T may be associated, is believed to occur when the præcordial electrode is facing the epicardial surface of the right ventricle, and the QR and QRS patterns when it is facing the epicardial surface of the left ventricle: hence the larger area of the præcordium which will normally give an inverted T in the child as compared with the adult, the right ventricle being relatively larger in the child.

Harold Cookson

**Peripheral Blood Flow, Rectal and Skin Temperature in Congestive Heart Failure. The Effects of Rapid Digitalization in this State.** H. J. STEWART, W. F. EVANS, H. BROWN, and J. R. GERJUOY. *Arch. intern. Med.*, 77, 643–658, June, 1946.

This paper describes an attempt to measure the total peripheral blood flow in patients with congestive cardiac failure before and after the intravenous administration of strophanthin-K and digitaline (Nativelle). Fifteen patients were admitted to hospital and placed at complete rest in bed. Fluid intake was limited to 1,200 ml. daily and salt intake to 3 g. Before administration of the drug four sets of observations of rectal and skin temperatures were made from which three control levels of peripheral blood flow could be estimated. Blood pressure, heart rate, basal metabolic rate, circulation time, and venous pressure were also estimated. Beginning 15 minutes after the injection, the authors repeated the observations at 20-minute intervals for 70 to 180 minutes. The data collected both before and after the injections were averaged. Strophanthin-K

was given intravenously in doses of 0.25 mg. except to those patients with mitral stenosis, to whom 0.125 mg. was given. Digitaline (Nativelle) was given in doses of 1.2 mg. Some patients had normal rhythm; others auricular fibrillation.

The average peripheral blood flow for all patients with heart failure was 32 ml. per square metre per minute as compared with 33 ml. for normal subjects. Both rectal temperature and average skin temperature were higher than in normal subjects.

The effect of strophanthin and of digitaline was to increase considerably the peripheral blood flow, to increase the average skin temperature, and to decrease the rectal temperature. The heart rate was slowed, the circulation time shortened, and the venous pressure lowered. The authors point out that other workers have shown that digitalis in heart failure produces a decrease in the size of the heart and an increase in cardiac output. Thus, during heart failure the volume of blood allotted to the peripheral circulation in unit time is in the normal range, but it moves so slowly in a distended vascular bed that it is insufficient to eliminate heat from the body and the rectal temperature rises. After the exhibition of strophanthin-K the peripheral blood flow increases, the skin temperature rises, and the rectal temperature falls. The highest peripheral blood flow following the administration of strophanthin-K occurs after 64 minutes, and that following the administration of digitaline (Nativelle) after 114 minutes. *Geoffrey McComas*

**Electrocardiographic Features of Myocardial Infarction as Affected by Involvement of the Septum and by Complete and Incomplete Transmural Involvement.** [In English.] H. E. B. PARDEE and M. GOLDENBERG. *Arch. Inst. Cardiol. Mexico*, 16, 109-130, May 31, 1946.

The post-mortem findings in 12 hearts were correlated with the electrocardiographic findings in leads I, II, III, IV F. Two anterior wall infarcts with septal involvement but without involvement of the sub-epicardial fibres showed a QS deflection (absent R wave) in IV F, a feature usually attributed to involvement of those fibres. The QS deflection was associated with septal involvement, as in 5 anterior wall infarcts (4 with no sub-epicardial involvement) it was absent in the only one without septal involvement. In 3 of the 4 cases without sub-epicardial necrosis, ST- and T-wave changes in the limb leads were similar to those seen after anoxæmia and exercise tests. In the fourth case typical changes of acute anterior infarction were seen in all 4 leads. Two complete posterior wall infarcts with septal involvement had typical acute ST- and T-wave changes in all 4 leads. Two posterior wall infarcts, without sub-epicardial and septal involvement, failed to show typical changes in any lead. Typical ST- and T-wave changes were only found in lesions involving the septum and adjacent anterior or posterior walls. Complete transmural involvement of the posterior wall was the

only constant pathological finding in cases with large Q 3.

Of 6 incomplete mural infarcts only 1 had a typical record of anterior or posterior wall infarction.

*W. T. Cooke*

**Coronary Occlusion in Young Adults. Review of Fifty Cases in the Services.** M. NEWMAN. *Lancet*, 2, 409-411, Sept. 21, 1946.

In view of the apparent rarity of coronary occlusion in young adults records were analysed of 50 Service men and women up to the age of 35 who had been invalided with, or had died from this condition. In 39 cases proof of coronary occlusion was obtained at necropsy, and in the surviving cases the diagnosis was supported by the characteristic cardiographic changes. The youngest patient was aged 20, and 22 of the 50 were in their twenties; as in the older age groups, the frequency increased with age. Coronary occlusion appears commoner in males than females in the younger age groups as well as in the older.

The striking feature was the good physical development and nourishment of these subjects; robustly built, they had a tendency to adiposity. Forty-five had been grade I on entry. The heart had been recorded as normal in every case, and all the subjects were apparently in excellent health.

Only 3 showed evidence of hypertension. Previous infection may have been of aetiological significance in a few cases; 3 gave a history of rheumatic fever, 2 of scarlet fever, and 1 (with marked coronary atheroma) had chronic osteomyelitis; 2, who both survived, had syphilis. In more than half there was no evidence of physical strain before onset, and less than half had done heavy work in their pre-Service occupation.

The 78 per cent mortality, 83 per cent of which was immediate, was surprisingly high, and would appear to indicate a much worse prognosis in younger people. At necropsy the left coronary artery was affected in 17 cases, the right in 5, and both in 16. The findings did not support the view of Leary (*Arch. Path.*, 1941, 32, 507) that calcification does not occur in the younger age group, and that coronary occlusion is due to sub-endothelial fibrosis with necrosis of the intima leading to thrombosis. Only 2 cases showed fibrotic reaction without calcification; the remaining 37 presented the usual degenerative atheromatous changes of coronary disease in older persons, several with extensive calcification. In 29 of the 39 cases no thrombus was found; half the cases showed recent or long-standing infarcts.

[The findings and conclusions are similar to those of Miller and Woods (*Brit. Heart J.*, 1943, 5, 101) who, however, noted a striking history of familial "defective tubing."]

*E. G. Sita-Lumsden*

**Haemodynamic Factors and Retinal Changes in Hypertensive Diseases.** [In English.] S. BJÖRK. *Acta med. scand. Supp.* 175, 1-165, 1946.